REMARKS

Claim 1 has been amended for clarity purposes.

Applicant's remarks, below, are preceded by quotations of the Examiner's comments, set forth in small, bold-faced type.

Remarks Responsive to December 17, 2003 Office Action

Quotations and Remarks found in the following section of this Response are in response to the Examiner's December 17, 2003, Office Action

> **A.) Shinagawa teaches geometric cell (col. 1, lines 7-25; col. 20, lines 6-26; col. 7, lines 40-67; fiqs. 1, 9-10, and 31). In other words, Shinagawa discloses a technique for inverting shape data, which is represented in a smaller amount than that of polygon data, into polygon data upon necessity. In that he discloses converting polygon data into precise shape data suitable for free-form surface representation. In addition, figures 9-10 discloses each icon represents either one cell or two cells related to each other through an operator. Two cells may be pasted by coinciding the flat top of one cell with the flat bottom of the other. The cells for hollow contours are depicted with white (open) icons and cells for solid contours with black (solid) icons. B.) Shinagawa teaches processing a declarative syntax (figs. 6-8). In figures 6-8, Shinagawa discloses scripting language for a program. In that a programmer is a user that is capable to declare syntax for a particular script of programming language to be operable. Figures 6-8 show examples of operator programs in pseudo-Pascal code. These codes define two procedures and three functions for later use for the users.**

The Examiner's rejection is respectfully traversed. Applicant respectfully submits that the Examiner's rejection may be based on a misinterpretation of terms used in the applicant's disclosure and claims, and the use of terms used in the Shinagawa reference. In particular, the term "geometric cell" as used in applicant's invention is not used in the same context as, and does not have the same meaning as, the term "cell" or polygon used in Shinagawa. It is respectfully submitted that the Examiner's comparison of the "cells" of the present invention, to the polygons and "cells" discussed in Shinagawa yields incorrect conclusions regarding the applicability of Shinagawa as a prior art reference. It is well established that terms used in the claims of a patent are to be read in the context of that patent's disclosure. Doing so makes clear

that the term "cell," as used in this application does not correspond to Shinagawa's polygons or other shape used to form a tessellated representation of a model (i.e., the claimed cells do not correspond to Shinagawa's polygons). Additional references which will further assist the Examiner in understanding the "geometric cells" of the present invention have been identified on an Information Disclosure Statement filed herewith.

It is respectfully submitted that terms used in Shinagawa are used in an different context from terms used in the present applciation. In particular, Shinagawa is understood as disclosing a technique for "inverting shape data" and this inventive context is quite different from that of the present application. Although the Examiner equates Shinagawa's polygons to the "cells" of the present application, the two are not the same. Shinagawa's "inverting" is a process of approximating exact geometry using polygons. The inversion is used to recreate a modeled surface from a polygonal approximation. The generated list of geometric cells produced in accordance with the present invention (i.e., the generated "Cell Descriptors") are not the same as Shinagawa's polygonal data. In particular, "Cell Descriptors" are not related to recreating a geometry from polygons.

The Examiner, in her comments, also asserts that Shinagawa teaches processing a declarative syntax. It is respectfully submitted that this is not correct. What Shinagawa shows are examples of operator programs in a pseudo-Pascal code. The described language is procedural (based on functions and procedures), not declarative. In contrast, the language of the invention is a declarative language (also referred to as a generative language). A declarative language, unlike a procedural language, is one based on constraints and rules) (see, e.g., initial claim 23). See also given declarative example : edges = " {body=<^^P> dim=1 neighbor={dim=2 attribute="UP"}} at page 8 of the application. It is widely accepted that generative and procedural languages are two separate branches in the field of scripting languages. Because Shinagawa discloses a procedural language, and does not disclose use of a declarative language, rejection under § 102 is not proper.

It is further submitted that the use of a declarative language is not suggested by Shinagawa. Indeed, it is submitted that Shinagawa would teach away from use of a declarative language insofar as use of a procedural language is a more "natural" fit for Shinagawa's processing of preexisting datasets consisting of a large number of polygons. In contrast, the declarative syntax described in the present application is not applied to the covering of existing datasets with patchworks of higher order geometries (cells in the cell complex vocabulary). On the contrary, the declarative syntax used in the present application is such as to permit an engineer to express simply, in high level terminology, the features of a model which are significant for a design process, and in no case is an existing polygonal shape accepted as an input to this process.

To state it differently, the Shinagawa intermediate model is a Reeb graph extracted from the polygonal model, i.e., a set of curves (or poly-lines) traceable on the surface of the model, which run between singular points. This graph is a skeleton of the object. The Shinagawa pseudo-Pascal is not a script, it is a programming pseudo code, and it is appropriate to supporting Shinagawa's process -- namely to creating a cellular model extracted from the polygonal model (with or without surface pasting), and based on the intermediate manipulation of a Reeb graph. The present application, in contrast, is dedicated to generating shapes, for which no preexisting shape exists, from combinations of "higher level specifications, called features" which are entities well accepted in the CAD domain, and common examples of which are the pocket, the pad, or the hole. The problem of covering an existing shape with a set of surface patches, has little in common with that of constructing complex shapes from a set of simple features and, accordingly, the inventions of the present application call for programming techniques that are different and not readily interchangeable with those disclosed in Shinagawa.

The examiner, in her comments, also cites several extracts from Shinagawa against claim 1. With respect to Col 1, lines 7-25, Shinagawa merely describes the well known process of approximating an exact geometry into a polygon mesh. This process is also know as tessellation. The cell descriptor generation of claim 1 (i.e., the generated list of geometric cells) has no

particular relationship with the tessellation process of Shinagawa and, in fact, cell descriptor generation is independent of tessellation (though a tessellation process may also be applied to a model). With respect to Col 20, lines 6-26 of Shinagawa, this citation describes a part of the process which determines the topological and geometrical information from the polygonal data. Shinagawa converts a polygonal representation of a model into a topological representation made of cells. Shinagawa does not identify cells, but rather, creates them. Accordingly, Shinagawa cannot be said to disclose the present application's inventions for identifying cell descriptors (i.e., for generating a list of geometric cells) because Shinagawa's polygons are an output produced by Shinagawa's method. Shinagawa cannot identify what was not yet created. In contrast, the cells of the present invention exist as an input to the claimed invention for identification of cell descriptors.

The Examiner is referred to the following references for an additional explanation of the geometric cell as used in the present application (copies of these references are provided with an IDS filed concurrently with this Response):

- Rossignac, J. R., O'Connor, M. A., "SGC: A Dimension-Independent Model for Pointsets with Internal Structures and Incomplete Boundaries", Geometric Modeling for Product Engineering, M. J. Wozny, J. U. Turner and K. Preiss, Eds., North-Holland, 1990, pp. 145-180;

- Sriram, Wong, and He, "GNOMES: an object-oriented nonmanifold geometric engine", Computer-Aided Design, Vol. 27, No. 11, pp. 853-868 (1995).

More particularly, the examiner is referred to page 855, column 2 of the Sriram, Wong and He article which explains that "The basic entities in SGC are known as cells. These are open connected subdivisions of n-dimensional manifolds (i.e. a cell's boundaries are not included in its point set). Basically, cells generalize the concepts of topological elements (face, edge, vertex) in current modellers, and they also encompass higher dimensional elements (e.g. volume).

Associated with each cell is an extent, which represents the geometry of the cell, and boundaries, which are lower dimensional cells that bound it or are embedded in it (interior boundaries)."

In summary, the undersigned respectfully submits that it is inappropriate to interprets the geometric cells of the present application so broadly as to encompass the polygons of Shinagawa or the Morse function cells discussed at, e.g., col. 8, lines 1-7 of Shinagawa. However, if the Examiner believes that such a broad scope is appropriate, the undersigned would be receptive to adding clarifying language to the claims to refine the scope of the claim language and request a telephone conference with the Examiner so as discuss appropriate clarifying language.

For at least the foregoing reasons, it is respectfully requested that the Examiner withdraw all claim rejections and allow the claims.

Shinagawa Is Not In the Same Field As The Present Invention

It is respectfully submitted that Shinagawa is not even in the same field of art as the present invention and, accordingly, the Examiner's use of Shinagawa as prior art is inappropriate. As described by the Examiner himself, Shinagawa "discloses a technique for inverting shape data, which is represented in a smaller amount than that of polygon data, into polygon data upon necessity." This is NOT what is disclosed and claimed in the present application. What the present application discloses is the generation of cell descriptors (i.e., a list of geometric cells). Nothing in Shinagawa teaches or suggests such an invention.

2. Applicant's arguments filed September 25, 2003 have been fully considered but they are not persuasive. As addressed below, Shinagawa teaches the claimed limitations.

The undersigned respectfully submits that the Examiner's December 12, 2003, Office Action fails to comply with MPEP requirements and, accordingly, the undersigned respectfully requests that the Examiner withdraw the Office Action and issue a replacement Office action.

Reasons why the Examiner's December 12, 2003, Office Action are not compliant with the MPEP are set forth below.

The undersigned respectfully submits that, in both the Examiner's May 23, 2003 Office Action and in the December 17, 2003, Action, the Examiner did not fully and completely stated the grounds for rejection of claims of the application. Furthermore, the December 17, 2003, Office Action does not fully address the arguments presented in the applicant's previous Response and has not fully explained why those arguments are not persuasive. As required by MPEP 707.07(f), "Where the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take not of the applicant's arguments and answer the substance of it." In response to the previous Office Action, the applicant did traverse the Examiner's rejection of claims in light of Shinagawa and the Examiner has now repeated those rejections in light of Shinagawa. As required by MPEP 707.07(f), the applicant is entitled to have the Examiner address the substance of the applicant's arguments. However, in the Examiner's current Action, the Examiner's stated a merely conclusory response that the arguments are "not persuasive", but the Examiner has not addressed the substance of the applicant's arguments. It is respectfully submitted that this is improper because it leaves the applicant without any understanding as to why the previously presented arguments and amendments were not sufficient to distinguish over the cited prior art. Quite simply, by simply repeating previous grounds for rejection, without providing any further explanation, the issued Office Action does not provide the applicant or the undersigned with enough information to ascertain why claims were rejected or why arguments presented were not persuasive.

It is respectfully requested that the Examiner withdraw the finality of the December 12, 2003, Action and issue a new Office Action fully addressing the substance of the arguments presented in the previous response. Previously-presented arguments are repeated below in courier font. The undersigned has also provided explanatory paragraphs numbered (1) through (7) to more clearly explain why the undersigned believes additional explanation by the Examiner is required.

Remarks Presented in Response to May 23, 2003 Office Action And For Which A More Complete Response is Requested

In a May 23, 2003, Office Action, as in the present Office Action, the Examiner rejected claims of the present application under § 102 in light of Shinagawa. In response to the May 23, 2003, Office Action, the undersigned replied:

> Claim 1 recites a method for use with a CAD system in modeling objects. The method providing a means for identifying geometric cells of a model, where each of said geometric cells comprising data defining a geometric feature of the model that is associated with said geometric cell, and identification data. The method includes receiving input comprising one or more constraints relating to geometric cell information; for each constraint and for each of a plurality of geometric cells of a model, processing a declarative syntax specifying at least one of said received input constraints to determine whether the cell meets the requirement of the constraint; and generating a list of cells meeting the requirements of the constraints.
>
> US Patent 6,323,863 to Shinagawa does not teach or suggest the invention recited by claim 1. The Examiner, in his comments, equates the claimed "geometric cell" to Shingagawa's disclosure of a polygon. The two are not the same. To prevent further confusion, claim 1 of the present invention has been amended to further clarify that the claimed "cell" comprises data defining a geometric feature of the model that is associated with said geometric cell and identification data. Shinagawa's polygon's do not define geometric features, but rather are used to express those features. An example of a defined geometric feature is, for example, data identifying the feature as a sphere having a particular radius. Thus, in one embodiment, the claimed geometric cells of the present invention would include, e.g., data defining the feature as a sphere and data specifying the radius. When that sphere is expressed (i.e., displayed on a CRT display), the modeling software may express the feature as a group of interconnected polygons (i.e., the polygons disclosed by Shinagawa). See also,

> application page 1, paragraph 2, describing the claimed geometric cells as "cells of the geometrical modeller". However, the underlying definition remains that of a "sphere" rather than that of a polygon.

The undersigned respectfully submits that the current Office Action fails to address the substance of the previous argument. For example, the Office Action does not provide a substantive answer to the following questions raised by the undersigned's prior response:

- (1) Does the Examiner dispute that Shinagawa's polygon merely expresses geometric features, or does the Examiner assert that geometric features are defined by Shinagawa's polygon?

- (2) If the latter, does the Examiner not distinguish between the expression of geometric features and the defining of those features? If the Examiner does distinguish between the two, in what way does the Examiner assert that Shinagawa's polygon defines geometric features, rather than merely expresses those features?

The undersigned believes that these previously-raised issues are significant and need to be clearly addressed to enable the undersigned to determine what, if any, modifications are needed to the claims and to enable the undersigned to determine whether, and what, additional explanation should be provided to the Examiner to more fully explain the distinctions of the present application and Shinagawa. It is respectfully submitted that, at this time, and based on the Examiner's current Office Action responding to the previous arguments, the undersigned cannot do more than guess as to the Examiner's reason for continuing to reject the claims.

In response to the May 23, 2003, Office Action, the undersigned further stated:

> The Examiner, in his comments, further asserts that Figs. 1, 18-element 2, and Fig.30-element 21 of Shinagawa disclose receiving input comprising one or more constraints relating to cell information. The

undersigned does not understand how the Examiner has reached this conclusion.

The undersigned wishes to call to the Examiner's attention the relevant requirements of the Manual of Patent Examining Procedure. As required by MPEP § 706.07, ground for rejection "must be clearly developed to such an extent that applicant may readily judge the advisability of an appeal." As required by MPEP § 707.07(d), when rejecting a clam for lack of novelty, the Examiner must fully and clearly state the grounds of rejection. Further, "where the applicant traverses any rejections, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it" (MPEP § 707.07(f)).

With the foregoing in mind, and in consideration of the amended claim 1's clarification of "geometric cell" the undersigned respectfully requests that the Examiner more fully and completely state the grounds of rejection for the above-referenced claim element. For example, what does Shinagawa disclose as a "constraint related to cell information" that is received from a user?

The Examiner, in the present Office Action, has failed to address substance of the above-presented argument and it is respectfully requested that the Examiner do so. In particular, the following point of clarification is requested:

- 3) It is requested that the Examiner more fully and completely state the grounds for rejection concerning the "constraint related to cell information" issue. That is, based on the Examiner's response, the undersigned does not understand how Shinagawa discloses a "constraint related to cell information" that is received from a user.

In the May 23, 2003, Office Action, the Examiner further argued that Shinagawa disclosed:

for each constraint, determining whether the cell meets the requirement of the constraint (figs 7 and 18 -element 3 is the determined unit that

determines if the cell meets the requirement of the constraint in programming procedure of figure 7);

In response, the undersigned replied:

The Examiner, in his comments, asserts that Shinagawa teaches: for each constraint, the method comprises the step of determining whether the cell meets the requirement of the constraint (disclosed Fig.7 and 18 with the element 3).

Applicant respectfully disagrees. What the cited section of Shinagawa teaches is a particular use of a "Morse" function (see, e.g., "element 3 ...determines a Morse function defined on the obtained polygon data" (column 17, lines 8-10)). The undersigned understands a Morse function to be a function for which all critical points are nondegenerate and all critical levels are different. This has nothing to do with the recitation of amended claim 1 which states "for each constraint and for each of a plurality of geometric cells of a model, processing a declarative syntax specifying at least one of said received input constraints to determine whether the cell meets the requirement of the constraint".

If the Examiner continues to view Shinagawa's teachings regarding Morse function as relevant to the claim 1 recitation that "for each constraint and for each of a plurality of geometric cells of a model, processing a declarative syntax specifying at least one of said received input constraints to determine whether the cell meets the requirement of the constraint", then the undersigned respectfully request that the Examiner provide an explanation that is "clearly developed to such an extent that applicant may readily judge the advisability of an appeal." MPEP § 707.07(d).

The undersigned respectfully submits that the Examiner has not fully addressed the substance of this argument. The undersigned believes it essential that the Examiner clearly address the distinctions pointed out by the undersigned regarding Shinagawa's teaching of the use of a Morse function and claim 1 which requires that "for each constraint and for

each of a plurality of geometric cells of a model, processing a declarative syntax specifying at least one of said received input constraints to determine whether the cell meets the requirement of the constraint". The undersigned respectfully submits that this recitation of claim 1 makes clear that a Morse function is NOT used for the recited computation and, accordingly, a § 102 rejection is not proper in light of Shinagawa which teaches use of Morse functions. In particular, the undersigned respectfully request that the Examiner provide a substantive response to the following issue raised in the undersigned's previous response:

- 4) Since it is clear that that Shinagawa teaches use of Morse functions for selection of certain geometric features for processing, the undersigned does not understand how the Examiner instead claims that Shinagawa discloses the above-quoted element recited by claim 1 which is not a Morse function. It is respectfully requested that the Examiner address the substance of this issue by further the Examiner's basis for equating a Morse function to the claimed "for each constraint and for each of a plurality of geometric cells of a model, processing a declarative syntax specifying at least one of said received input constraints to determine whether the cell meets the requirement of the constraint". The undersigned respectfully submits that the two are not the same and should not be equated and that a § 102 rejection is not supported.

In the May 23, 2003 Office Action, the Examiner further asserted that Shinagawa teaches:

> **generating a list of cells meeting the requirements of the constraints (col. 8, lines 1-22; col. 9, lines 13-46; col. 10, lines 5-13-list of array consisting of a list of cells).**

In response, the undersigned replied:

> Applicant does not understand how the cited disclosure of Shinagawa teaches of suggest "generating a list of geometric cells meeting the requirements of the constraints" as recited by claim 1. If

the Examiner continues to view Shinagawa as relevant, then further explanation of the relevance is respectfully requested.

- 5) The undersigned respectfully repeats the request that, in accordance with the Examiner's obligation under MPEP 707.07, the Examiner explain how Shinagawa teaches "generating a list of geometric cells meeting the requirements of the constraints" as recited in the context of claim 1. The disclosure cited by the Examiner does not make this clear. For example:

    - The Examiner cites to col. 8, lines 1-22. The undersigned understands this to be merely a discussion concerning the Morse function and construction of certain graph constructs. How does this disclose "generating a list of geometric cells meeting the requirements of the constraints" where that list of cells was first determined by "processing a declarative syntax specifying at least one of said received input constraints to determine whether the cell meets the requirement of the constraint"? The discussion of the Morse function at col. 8, lines 1-22 appears to argue against the Examiner's conclusion (i.e., even if a list of geometric cells is being generated, a point which the undersigned does not agree with, it is clear that this list is not one determined by ""processing a declarative syntax specifying at least one of said received input constraints to determine whether the cell meets the requirement of the constraint." The undersigned respectfully points out that each element of the claim must be read in-context with other elements of the claim to obtain a consistent reading of the claimed invention. The undersigned submits that this has not been done.

    - The Examiner also cites to col. 9, lines 13-46. Again, this disclosure does not appear to support the Examiner's contention for reasons similar to those discussed with respect to col. 8, lines 1-22.

    - The Examiner also cites to col. 10, lines 5-13. While, again, there is some discussion of operation on cells, the subject discussed here is not what claim 1 recites. Claim 1

recites "generating a list of geometric cells meeting the requirements of the constraints" where that list of cells was first determined by "processing a declarative syntax specifying at least one of said received input constraints to determine whether the cell meets the requirement of the constraint." The undersigned respectfully submits that the cited text of Shinagawa does not teach or suggest this claim element.

In the May 23, 2003, Office Action, the Examiner presented the following claim rejections:

> **Re claims 4, 6, 8, 10, 12, 14, 16-17, 20, and 22, the limitations of claims 4, 6, 8, 10, 12, 14, 16-17, 20, and 22 are identical to claim 2 above. Therefore, claim 4, 6, 8, 10, 12, 14, 16-17, 20, and 22 are treated the same as discussed with respect to claim 2 above.**

In response, the undersigned replied:

The undersigned respectfully disagrees that the limitations of claims 4, 6, 8, 10, 12, 14, 16-17, 20, and 22 are identical to claim 2, and this rejection is respectfully traversed. As explained below, with respect to the Examiner's rejection of claims 5, 7, 9, 11, 13, 15, 18-19, 21, and 23, each of claims 9, 11, 13, 15, 19, 21, and 23 include claim recitations that are not found in claim 1. Substantially similar claim recitations are lacking from claims 10, 12, 14, 16-17, 20, and 22. Furthermore, and contrary to the Examiner's suggestion, because the above-identified claims are not "identical to claim 2 above", the Examiner's rejection of the above-referenced claims is improper in light of MPEP requirements that the Examiner's rejection be fully and clearly stated. For at least the reasons stated below, the undersigned respectfully requests that the Examiner state fully and completely the grounds of rejection for each of the above-referenced claims or withdraw the rejection of these claims.

- 6) Although the undersigned has specifically pointed out differences in the claims and made clear that the claims are not "identical to claim 2" the Examiner has failed to address the differences between the independent claims and claim 2. The undersigned respectfully request that the Examiner fully explain reasons for rejections of all claims.

In the May 23, 2003, Office Action, the Examiner presented the additional claim rejections:

> **Re claims 5, 7, 9, 11, 13, 15, 18-19, 21, and 23, the limitations of claims 5, 7, 9, 11, 13, 15, 18-19, 21, and 23 are identical to claim 1 above. Therefore, claim 5, 7, 9, 11, 13, 15, 18-19, 21, and 23 are treated the same as discussed with respect to claim 1 above.**

In response, the undersigned replied:

The undersigned respectfully disagrees that the limitations of claims 5, 7, 9, 11, 13, 15, 18-19, 21, and 23 are identical to claim 1.

For example:

- In claim 9 only the claim preamble and the claim recitation "a) receiving input comprising one or more constraints relating to cell information" can be found in claim 1. The remainder of claim 9 is different from what is in claim 1. Similarly, claims 11, 13, and 15 each include recitations similar in substance to those found in claim 9 and, like claim 9, each include claim recitations substantially different from that of claim 1.

- Claim 19, and 21 each recite "receiving textual input specifying one or more pre-defined geometric parts, and the location and size of such parts;" and this recitation, among others, is not found in claim 1.

- Claim 23 recites "creating a set of scripting rules … ", "receiving a user script input … ", "interpreting said user input for translating …" and "selecting the cells that meet all of the

described characteristics …". Not even a single one of these is recited by claim 1.

The foregoing are just some of the examples of elements found in the referenced claims that are not found in claim 1 (and are believed to be lacking in the cited prior art). Thus, contrary to the Examiner's suggestion, the above-identified claims are not "identical to claim 1", and the Examiner's rejection of the above-referenced claims is improper in light of MPEP requirements that the Examiner's rejection be fully and clearly stated.

For at least the reasons stated above, the undersigned respectfully requests that the Examiner either (i) issue a new non-final office action fully conforming to the MPEP requirement and fully and completely stating the grounds of rejection for each of the above-referenced claims or (ii) withdraw the rejection of these claims.

7) The undersigned respectfully repeats the request that the Examiner fully address the specific differences between the independent and dependent claims pointed out in the previously-presented arguments. It is respectfully submitted that the Examiner is required to address these difference and has failed to do so.

It is respectfully requested that the Examiner withdraw the finality of the December 17, 2003, Office Action and allow the claims or issue a new Office Action fully addressing the substance of the arguments raised in applicant's prior response as well as those additional arguments raised herein.

CONCLUSIONS

Claims 1-25 are now pending and are believed to be in condition for allowance.

No new matter has been added.

Please apply any credits or excess charges to our deposit account number 50-0521.

Respectfully submitted,

Date: June 16, 2004

James V. Mahon
Reg. No. 41,966
(212) 878-8073

MAILING ADDRESS
Clifford Chance US LLP
31 West 52nd Street,
New York, NY 10019-6131